

STREETSMART PRO®

CHARTS

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Charting Overview

Charts provide a quick way to absorb data and understand a security's performance. They provide vast amounts of data in an efficient, user-friendly, customizable format, making it easy to analyze price and volume movements in real time.

Add Studies, Trend Lines, and even technical analysis Strategies to charts to enhance your ability to spot trends and buy/sell opportunities.

To open, click  in the Toolbar.

StreetSmart Pro® software has advanced charting tools that give you the freedom to customize your charting experience to your precise specifications. Features available include more than 25 customizable studies (or indicators); trend lines and studies including SMA, EMA, Bollinger Bands and Envelopes; chart types, including point and figure, bar, line, and candlestick; and much more.

You may display up to 6 chart windows in a single layout with up to 20 tabs (each with unique chart settings) in each window, effectively allowing you to display up to 120 charts in one layout. Each tab can be setup to copy the setting from another tab or be unique to the tab itself.



Stock symbols and price and volume data shown here and in the software are for illustrative purposes only. Charles Schwab & Co., its parent or affiliates, and/or its employees and/or directors may have positions in securities referenced herein, and may, as principal or agent, buy from or sell to clients.

CHARTING MENU BAR

FILE	
Load Default	Loads the Default settings to a chart or tab.
Set as Default	Click Set as Default when you want the Chart window or individual tab to open with the current settings every time you open a new chart. ❖ TIP: The defaults work on an individual tab basis, so if you set a default in one tab, it is the settings of that tab that become the default; not the settings of the whole chart window.
Reset Default	Return to the program Default settings.
Page Setup	Enables you to customize the current page for printing. Read the Printing Windows topic in the Getting Started section for more information.
Print	Click to print the chart currently displayed.
Close	Click to close the chart currently displayed.
Printing Charts Tip: If charts are not printing clearly, try changing the background color to white.	

EDIT	
Symbol	Changes the symbol current being displayed in the Chart. ! NOTE: This can also be done by right clicking on the chart or by just typing a new symbol when the Chart window is active
Tick Data	Allows you to change specific bad data displayed in a chart that may impact the technical studies you are using. To edit tick data: <ol style="list-style-type: none"> 1. Click on the bar, line, or candle that has bad data. 2. Click on Edit > Edit Tick Data 3. The date at the top should be for the date you last clicked, if it is not, you can select the date or time from the pull-down menu. 4. Make the appropriate changes to Open, High, Low, or Close. 5. Click OK.
Delete Selected Item	1. Select the item to remove by clicking on the label for any study or trend line, or for support and resistance lines, click on the line itself.

	<ol style="list-style-type: none"> 2. Select Delete Selected Item to remove it from the chart. 3. You can also delete the selected line or label by pressing Delete on your keyboard or right-clicking on the label or line and selecting Delete.
Delete All	Deletes all of the available items for a group. The groups are Studies, Trend Lines, Support Lines and Resistance Lines.

VIEW	
Time Lines	If checked, lines marking the time frame the chart spans (i.e., hours, days, months, etc.) are visible.
Price Lines	If checked, lines marking various price levels are visible.
VAP	<p>If checked, lines marking where the highest Volume Average Prices have occurred.</p>  <p><i>Stock symbols and price and volume data shown here and in the software are for illustrative purposes only. Charles Schwab & Co., its parent or affiliates, and/or its employees and/or directors may have positions in securities referenced herein, and may, as principal or agent, buy from or sell to clients.</i></p>
Info Window	<p>The Info Window provides the statistical data for the point on the chart you have clicked on. When you first open the window from the pull-down, today's data will be displayed. To change the displayed data, either left-click on a specific point on the chart or hold down the left mouse button and move the mouse to find the date you want.</p> <p>If you haven't made any changes to the chart, the data in the window will include that day's Open, High, Low, Close, Volume, and BOL (Bollinger Bands). When you add more studies to the</p>

	chart, they will also appear in the window. As you increase the number of viewed studies, you may not be able to see all of the statistical data in the window. To view all of the data available, you may need to resize the window by dragging the corner with the cursor until the all data is displayed.
NOTE: You can access Settings, Views, Tools, and Trend lines by either using the respective pull-downs or right-clicking on the chart.	

INSERT	
Studies	<p>The software allows you to add a vast number of studies to your chart for technical analysis.</p> <ol style="list-style-type: none"> 1. Highlight the study you wish to add in the left column. 2. Click the >> to move it to the box on the right. 3. Choose the Show In option and place the study in any of the options in the drop down menu. 4. Click OK. <p>Go to Chart Studies for information on each available study.</p>
Trend line	<ul style="list-style-type: none"> • Select the Type of trend line to display. Go to Trend Lines for more information on which Trend lines are available. • Type a label for the trend line so that you can identify it on the chart. In the chart below, we have identified an upward trend.  <ul style="list-style-type: none"> • Right-click on the label to Edit or Delete the line.
Support	Adds a horizontal GREEN line wherever you click on the chart to indicate the Support levels you want to identify in the chart you are viewing.
Resistance	Adds a horizontal RED line wherever you click on the chart to indicate the Resistance levels you want to identify in the chart you are viewing.

SETTINGS
GENERAL

General

Data Options

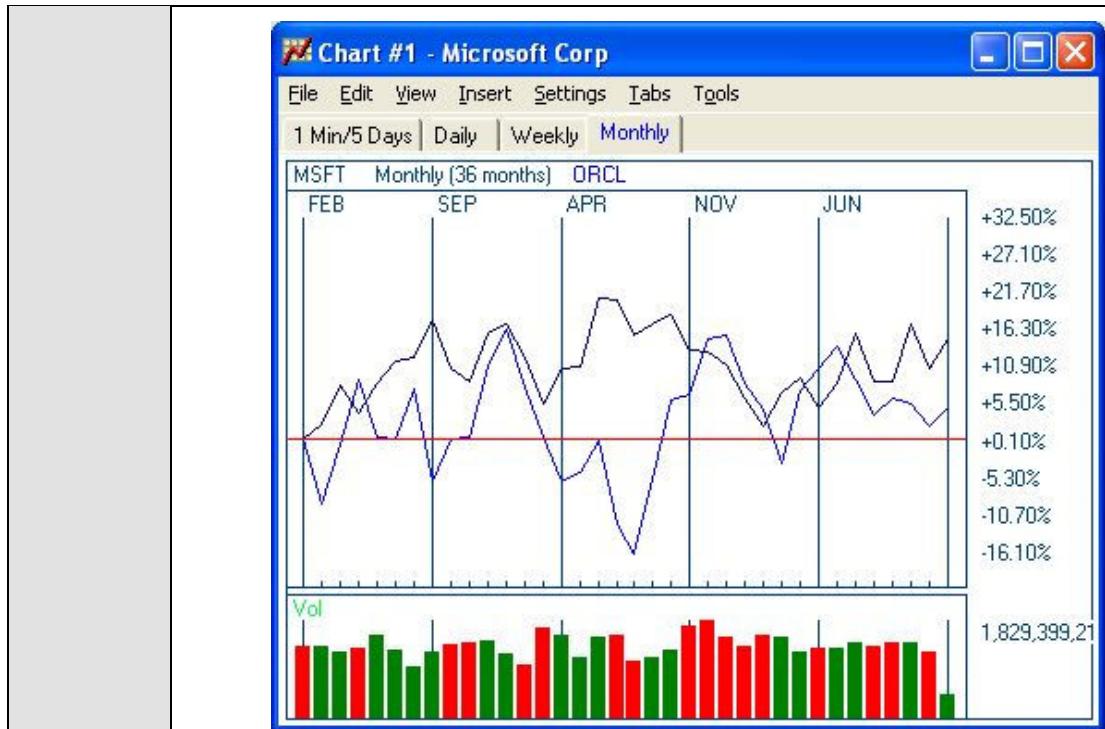
Chart Type <input style="border: 1px solid black; padding: 2px 10px;" type="button" value="Daily"/>	Market Hours <input type="text" value="930"/> - <input type="text" value="1600"/>
Range (days) <input type="text" value="995"/>	
Interval (minutes) <input type="text" value="3"/>	<input type="checkbox"/> Chart 60 Min Bars on the Hour
Overlay Symbol <input type="text"/>	<input type="checkbox"/> Use % Scale with Overlay

Display Options

Graph Style <input style="border: 1px solid black; padding: 2px 10px;" type="button" value="Candlestick"/>	<input type="checkbox"/> Outline
Overlay Style <input style="border: 1px solid black; padding: 2px 10px;" type="button" value="Line"/>	
Graph Line Width <input type="text" value="1"/>	Study Line Width <input type="text" value="2"/>
Data to show: <input type="text" value="120"/> Day(s)	<input type="checkbox"/> Show all data
Price scale (\$'s) <input style="border: 1px solid black; padding: 2px 10px;" type="button" value="Auto (linear)"/>	<input type="checkbox"/> Show Price Scale on Left
<input checked="" type="checkbox"/> Show Last Trade Label	
<input checked="" type="checkbox"/> Show High, Low, Open, Close values on chart	

Data Options	
Chart Type	Choose the period the chart will be based on: Monthly, Weekly, Daily, Intraday.
Range (days)	Enter number of periods up to 240 months for Monthly charts, 3,000 days for Daily charts, 250 weeks for Weekly charts, 30 days for an Intraday chart. ! NOTE: The number of days available on an Intraday chart decreases along with your Interval setting. For instance, if you choose 1 minute intervals, you will only see 4 days of data; however, as you increase your interval, you can increase the number of days back available to view. 60 days of Intraday charts are only available when the interval is 10 or higher in intervals of 5. For example you can get 10 days for Intervals of 10, 15, 20, 30, 60. You can only get 5 days for Intervals of 1-5 minutes or any other number that is not devisable by 5.
Interval (minutes)	Applicable to Intraday charts only.

Overlay Symbol	Enter a symbol to overlay on your chart.
Market Hours	<p>Enter the hours you want chart data for in military time (for example, 1600 for 4:00 p.m. ET).</p> <p>! NOTE: Beginning time can be no earlier than 0600 and no later than 0930 ET. Closing time can be no earlier than 1600 and no later than 2000 ET.</p> <p>Default times are for the standard session only (09:30 to 16:00 ET). As extended hours quotes are only available streaming, it is possible to have gaps in your chart if you ask for all session times (i.e., 0600 to 2000 ET). The only way to view this data consistently on a chart is to leave that chart open during Pre Market or After Hours Sessions. If you switch stocks within the same chart, this will generate gaps as the data is not presented to the chart while open. Charts will not populate data for times prior to when the chart was opened, regardless of the settings of the chart.</p>
Chart 60 Min Bars on the Hour	If checked, starting at 10:00 a.m. ET, a chart using 60 minute bars will be based on the hour (10-11, 11-12, etc.) rather than the half-hour (9:30-10:30, 10:30-11:30, etc.)
Use % Scale with Overlay	<p>When overlaying another symbol on the chart, checking this box will change the display to a percent scale. Percentages are based off the performance over the time period (intraday, daily, monthly, etc.)</p> <p>❖ TIPS:</p> <ol style="list-style-type: none"> 1. For the classic look, a line chart can be selected with a line overlay. Go to Settings > Colors to configure the colors of these lines for best display. 2. The current price will display in the right-hand scale that defines the percentages. To remove that display go to Settings > General and uncheck the Show last trade label box located at the bottom of that window. 3. Use a support or resistance line and place it at the zero percent level. This level can be easily located as the starting point on the left when the symbol and overlay begin plotting. 4. Use the crosshairs to see the exact percentage numbers.



Display Options

Graph Style

Bar

- On a daily chart, each bar is one day. On an intraday chart, each bar represents one interval.
- On Bar charts, the left rung indicates the opening price of the stock, and the right rung indicates the closing/last price of the stock for the day or interval.
- The top and bottom of the bar represent the high and low for that day or interval.
- **Green** indicates the security's closing/last price for the day or interval was higher than today's opening price.
- **Red** indicates the security's closing/last price for the day or interval was less than or equal to today's opening price.

Calculate Change From Open/Close

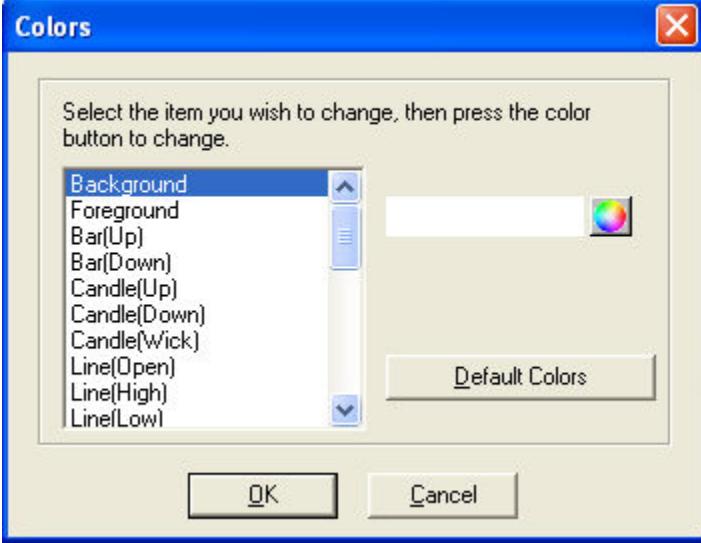
- Allows you to select the basis for the calculation of bars. By default this setting is Change from Open, which calculates a bar as up or down based on the difference between the open and closing price. When set to Change from Close, the color (or change) of each bar is determined by the difference between the previous bars closing price and the current bars last (or closing) price.

Candlestick

- On a daily chart, each stick is one day. On an intraday chart, each stick represents between 1 and 120 minutes.
- **Green** indicates the security's closing/last price for the day

	<p>or interval was higher than today's opening price.</p> <ul style="list-style-type: none"> • Red indicates the security's closing/last price for the day or interval was less than today's opening price. • Gray indicates the security's closing/last price for the day or interval was equal to today's opening price. • The top and bottom of the line behind it represent the high and low for the day/period. <p>Outline Candlesticks</p> <ul style="list-style-type: none"> • Check or uncheck your preference to have the Candlesticks outlined or not. This is only available when candlestick is selected as graph style. <p>Line</p> <ul style="list-style-type: none"> • Yellow Opening price for that day or interval. • Green High price for that day or interval. • Red Low price for that day or interval. • Blue Closing/last price for that day or interval. <p>Line Graph</p> <ul style="list-style-type: none"> • When selected, you can choose which lines to view: Open, High, Low or Close. <p>Point & Figure Charts</p> <p>When selected, you can choose how to display the following items for Point & Figure:</p> <ul style="list-style-type: none"> • Box size from 0.05 to 500 • Using either High/Low or Close • Reversal from 1 to 5.
Overlay Style	If applying an overlay of a second symbol, the style is set here.
Graph Line Width	This gray field is adjustable with the up or down arrows to the right of the field. The higher the number, the bolder the line in the chart. ! NOTE: A higher setting may cause distortion to the graph.
Study Line Width	This gray field is adjustable with the up or down arrows to the right of the field. The higher the number, the bolder the line in the chart. ! NOTE: A higher setting may cause distortion to the graph.
Data to show	Specify the number of days to display in the chart at any one time. ! NOTE: This is only applicable when the Show all data field is unchecked.
Show all data	If checked, shows chart for the time frame specified in the Range (days).

	If unchecked, this will display what is indicated in the Data to show field. A scroll bar will appear at the bottom of the chart allowing you to move back and/or forth through Range (days) selected.
Price scale (\$'s)	<p>Specify the increments for the price scale, from .05 to Auto or Logarithmic. Once a price interval is selected (not Auto or Logarithmic), you can manually input an interval. You should select an interval that is appropriate to the price range of the security you are charting for the selected Range (days).</p> <ul style="list-style-type: none"> Default is Auto, which allows the software to select the optimal scale based on the size of the chart. Logarithmic, or percentage, scaling will change the price scale's appearance by making the vertical spacing between two points correspond to the percentage change between those numbers. So, for instance, the vertical distance between 10 and 20 and the vertical distance between 50 and 100 will be the same. This helps provide a truer picture of charts with large vertical ranges.
Show Last Trade Label	Highlights the last trade price in the Price Scale.
Show Price Scale on Left	The Default will display the Price Scale on the right. By checking this field, the Price Scale will display on the left.
Show High, Low, Open, Close Values on Chart	Overlays the lines for High, Low, Open and Close on the chart.
Chart Type	<p>Allows you to quickly change between Monthly, Weekly, Daily, and Intraday charts.</p> <p>The Settings > General window determines how many days or intervals are displayed.</p>
Back Test	You can change the Back Test settings when applying a Strategy to the chart to see how having a different starting equity or trade quantity, or adding commissions to the cost of the trades, will affect the outcome of the test.
Fonts	<p>Click to change the font style in the chart.</p> <ol style="list-style-type: none"> When the Font box opens, select the type, style and size. Click OK. <p>! NOTE: Large font sizes may not allow for a clean view of the text displayed in the chart.</p>

Colors	<p>To change the colors in a chart:</p> <ul style="list-style-type: none"> • Select the item you wish to change, then press the color button to change, and click OK. 
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TABS

For more on tabs visit the [Adding Tabs to Windows](#) topic

Enable	Clicking Enable will create 2 tabs in the Chart Window, your current chart, plus an additional chart which you can customize separately using the Tabs > Edit menu item.
Insert	Add more tabs than the 2 added when enabled.
Edit	Edit the selected tab.
Remove	Remove the selected tab
Use same symbol for all tabs	When checked, all of the tabs within the Chart window will use the same symbol. When unchecked, all of the tabs can have specific symbols saved within the tabs.

TOOLS

Studies	<p>The software allows you to add a vast number of studies to your chart for technical analysis.</p> <ol style="list-style-type: none"> 1. Highlight the study you wish to add in the left column. 2. Click the >> to move it to the box on the right. 3. Choose the Show In option and place the study in any of the five options in the drop down menu. 4. Click OK <p>Go to Studies for information on each available</p>
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	study.
Strategy Center	Open the Strategy Center to apply a strategy to the chart. You can also edit or create a new strategy from the Strategy Center. To add a strategy to the chart, click on the strategy in the Available Strategies list and check Show selected strategy on chart .
Edit Strategy	Opens the Edit Strategy window for the strategy currently applied to the chart and will allow you to make changes to both the Strategy details and the chart display.
Show Strategy	Once an initial strategy has been applied to the chart, you can use Show Strategy to hide or show the strategy on the chart.
Strategy Performance Details	The Strategy Performance Details window breaks down the details and statistics of the strategy being tested in the Chart window.
Crosshairs	Select to change your cursor to display a crosshair when you click on the chart. The Crosshair pointer can help you pinpoint prices on a chart more easily than when using the regular cursor. Select again to turn off Crosshairs.
Zoom In	Allows you to zoom in on a smaller area of a chart without having to change your Chart settings. 1. Click Zoom In 2. Click and hold the mouse button on the point within the chart where you wish to start to zoom in 3. Drag your mouse across to the point where you wish to end the zoom in and release the mouse button.

❖ **TIP: Right-Click Charts Shortcut**

Right-clicking on a chart opens a menu allowing you to:

- Recent Stories for [Symbol]
- Research/Ext. Quote for [Symbol]
- Apply an Alert to [Symbol]
- Change Symbol...
- View: Time Lines, Price Lines, VAP (Volume At Price), and Info Window
- Chart Type (Monthly, Weekly, Daily or Intraday)
- Show all Data
- Trend, Support, and Resistance lines
- Tools: Studies, Strategies, Crosshairs, Edit Tick Data, Zoom-in
- Hide/Show Menu

CHART TOOL BAR

The Chart Toolbar allows quick access to the most commonly used chart features.

To enable, click **Toolbars > Chart Toolbar** in the main menu.

- Most buttons clicked in the Chart Toolbar will affect the *most recently accessed* Chart window.

EXAMPLE You have 3 chart windows open, and you most recently clicked on Chart #2. When you click the Add/Edit Studies button, it will open for Chart #2. If you want the button you press to affect another chart, click that chart first and then click the button in the toolbar.

- The Regular, Snap to, and Best Fit trendlines are the exceptions and can be clicked in the toolbar and applied to any chart in your layout.
- Click anywhere in the main menu, and then hover your mouse over a button to see a **Tool Tip** that says what the button will do.
- All the buttons in the Chart Toolbar correspond to a feature also found in the menu of each Chart window.

Customizing the Chart Toolbar

Customize which icons are displayed on your chart toolbar. Select **Toolbars > Customize > Chart Tool Bar** from the main menu or right-click on the Chart Tool Bar and select **Customize...** The Chart Tool Bar customization window will open. You can then select which tools you want displayed on your toolbar.

- Use the **Add/Remove** buttons to move buttons between the Available and Current columns.
- Use the **Move Up/Move Down** buttons to put the buttons in the Current toolbar in the order you prefer.
- Click **Close** when you are finished customizing your Chart Toolbar.

Moving the Chart Toolbar

The Chart Toolbar can be displayed vertically on the left/right hand side, or the top or bottom of the frame, or it can be removed to be a free-floating window.

1. Move your mouse pointer to the thin bar on the left side of the Chart Tool Bar.
2. Click on that bar and then drag the window to the location of your choosing.
3. Let go of the mouse button.

Toolbar Features

Not all buttons are displayed by default. To add a button, click **Toolbars > Customize > Chart Tool Bar** in the main menu.

	Chart General Settings	Open the General Settings for the most recently accessed Chart window.
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	Crosshairs	Select to change your cursor to display a crosshair when you click on the chart. The Crosshair pointer can help you pinpoint prices on a chart more easily than when using the regular cursor. Select again to turn off Crosshairs.
	Chart Type	Choose Monthly, Weekly, Daily, Intraday, or Tick
	Chart Interval	Choose from 5 to 120 minutes or select Other to open the Chart Settings window where you can enter a different interval. Only applies to Intraday chart types.
	Add/Edit Studies	Click to open the Add/Edit Studies window, which lets you add technical analysis studies to your chart. Go to Chart Studies for information on each available study.
	Trend Lines	Click to draw Trend Lines on the chart. The pointer will change to a pencil icon. Click and drag to draw the trend line. Click the Trend Line button again to stop drawing trend lines (or select another button).
	Edit Trend Lines	Click and select from the drop-down list which Trend Line you wish to edit. The button is only available when the most recently selected chart has trend lines drawn on it. The Edit Trend Line window lets you select the type of trend line (regular, Fibonacci, best fit (regression), etc.), as well as the color and label (name) for the line.
	Support	Adds a horizontal GREEN line wherever you click on the chart to indicate the Support levels you want to identify in the chart you are viewing.
	Resistance	Adds a horizontal RED line wherever you click on the chart to indicate the Resistance levels you want to identify in the chart you are viewing.
	New Tab	Click to add a new tab to the most recently accessed chart window. You must have Tabbing enabled for the chart in order to click the New Tab icon.
	Show All Data	If checked, shows chart for the time frame specified in the Range (days). If unchecked, this will display what is indicated in the Data to show field. A scroll bar will appear at the bottom of the chart allowing you to move back and/or forth through Range (days) selected.

	Edit Tick Data	Allows you to change bad chart price data, which may impact the technical studies enabled on the chart. Click the Edit Tick Data button in the toolbar and then click the price point you need to edit on the chart. A window will open that allows you to change all four price points for that period (open, close, high, low).
	Delete	Click the Delete icon to see a list of studies and trend lines in the most recently accessed chart so that you may delete one or more of them. You can also chose Delete All Studies to clear all studies from the chart. Delete will not clear support and resistance lines. You must right-click on the line and select Delete to remove it.
	Graph Style	Switch between Bar, Candlestick, Line or Point & Figure chart types. Read more about each of these graph styles in the Chart Menu Bar topic.
	Time Lines	Click to hide or show the vertical time lines on the chart.
	Price Lines	Click to hide or show the horizontal price lines on the chart.
	Best Fit	Click the button and then click on the chart to apply a Best Fit Regression trend line to the chart. Read more about Best Fit in the Trend Lines topic.
	Snap To	Click the button and then click and drag a line on the chart to apply a trend line that "snaps to" the open, high, low, or close of the trend being studied. To change which price the trend line snaps to (the default setting is Close), click the Edit Trend Lines button in the toolbar and choose the Snap To line you wish to edit. Read more about Snap To in the Trend Lines topic.
	Fibonacci Retracement	Click the button and then click on the chart to draw a Fibonacci Retracement line. Read more about Fibonacci lines in the Trend Lines topic.
	Fibonacci Fan	Click the button and then click on the chart to draw a Fibonacci Fan line. Read more about Fibonacci lines in the Trend Lines topic.

	Fibonacci Arc	Click the button and then click on the chart to draw a Fibonacci Arc line. Read more about Fibonacci lines in the Trend Lines topic.
	VAP	Click to show lines bars on the chart where the highest Volume Average Prices have occurred.
	Alerts	Click to add a Conditional Order or Alert on the security in the most recently accessed Chart window.
	Help	Open the Online Help directly to information on using Charts in StreetSmart Pro.

CHART WINDOW SETTINGS

Chart Settings

StreetSmart Pro® software gives you real-time interactive charting capability with a wide range of customizable features. You can:

Open a New Chart

Open as many as six charts at one time.

1. Go to the Toolbar.
2. Click the chart icon .

Link Charts to the Trading Window

A chart, or multiple charts, will automatically load the symbol of the stock in the Trading window if they are linked.

To link charts to the Trading window:

1. From the Trading Window, select **Settings > Links**.
2. This allows you to link from a Trading Window to any chart or combination of charts. To link to multiple charts, such as Chart 2, Chart 2 must be open prior to going to **Settings > Links**.

Open Charts That Are Not Linked to the Trading Window

1. Highlight the chart by clicking it.
2. Type the symbol you want and press **Enter**.

Get Chart Statistics

While in the chart, click the left mouse button and the following information window will appear:

#1 - 08/01/00	
Open	64.75
High	70.00
Low	58.50
Close	68.63
Volume	943,610,500
ARSI 14	66.83

The contents of this window will vary depending on the studies that you have selected in your chart.

To Move the Window to Another Location on the Chart:

1. Click the mouse button and keep it pressed.
2. Place the mouse cursor on the top blue title bar of the window and release the mouse button.
3. Click the mouse button again and keep it pressed while you drag the window where you want it.
4. The window will only be visible while the left mouse button is down or while the cursor is on the information window.

! NOTE: To make the Info Window easier to move or always open, click **View > Info Window**.

To Expand the Detail of the Info Window:

1. Left-click the mouse button and keep it pressed.
2. Place the mouse cursor on the Info Window and then let go of the mouse button.
3. Drag your mouse cursor to the bottom edge of the info window until the arrow changes to a small black arrow pointing in two directions.
4. Keep it pressed while you drag the window down to increase the size.

STRATEGY TESTING IN CHARTS

See a graphical representation of your Strategy Tester results in a chart. View the entry and exit points the strategy identifies and instantly see if the stock really did move up or down.

To set up, click **Tools > Strategy Center** in the Chart menu.

The image below shows long entry and exit points based on the Bollinger Band strategy, which was applied to the chart.



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The strategy testing tools available in the Strategy Tester window are also available here in the Chart window:

- From the **Settings > Back Test...** menu, you can change the settings for the back test, such as commissions, quantity per trade, and initial equity. Refer to Back Test Settings to learn about each of those settings.

❖ **TIP:** When establishing Back Test settings for a strategy being used in a Chart the "Bar Size" and "Number of Bars for Test" is effectively the same thing as the Interval and the Range in the chart **Settings > General**.
- From the **Tools** menu, you have access to:

Strategy Center...	Open the Strategy Center to apply a strategy to the chart. You can also edit or create a new strategy from the Strategy Center. To add a strategy to the chart, click on the strategy in the Available Strategies list and check Show selected strategy on chart .
Edit Strategy...	Opens the Edit Strategy window for the strategy currently applied to the chart.
Show Strategy	Once an initial strategy has been applied to the chart, you can use Show Strategy to hide or show the strategy on the chart.

Strategy Performance Details...	The Strategy Performance Details window breaks down the details and statistics of the strategy being tested in the Chart window.
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Studies and Trends

CHART STUDIES

Chart Studies use a stock's price movements, volume, and other historical information to attempt to find patterns that may indicate shifting price trends.

By learning what a particular study may be indicating and then applying that study to your charts, you may be able to identify trading opportunities, points of support or resistance at certain price thresholds, price trends, and more.

Add Studies to a chart from the **Tools > Studies** menu.

StreetSmart Pro® software allows you to incorporate studies into your charts for technical analysis. Studies can:

- Overlay on the price chart
- Display below the price chart (use the **Show In** drop-down located in the Studies window to put additional studies in separate panels in the Chart Window.)

! NOTE: The same study can be displayed in both places.

Choose from the following default study parameters:

Study Name	Description
Adaptive RSI	<p>Adapts the standard RSI to a smoothing constant. Default of 14 periods (minutes, hours, days, etc.) can be changed.</p> <p>For calculation purposes, Adaptive RSI is somewhat similar to an exponential moving average, but instead of averaging prior values using a fixed percentage, it uses a variable percentage based on the RSI. The formula is</p> $ARSI_t = Close_t \text{ for } t < n$ $ARSI_t = ARSI_{t-1} + sc * (Close_t - ARSI_{t-1}) \text{ for } t \geq n$ $sc = 2 * \left \frac{RSI_t}{100} - .5 \right $ <p>where sc and n is the RSI period (i.e. an n-period RSI).</p>
Average DM (ADX)	<p>Average Directional Movement is an oscillator that fluctuates between 0 and 100, reading above 60 are relatively rare. It's values are interrelated with +DI, -DI and DX.*</p>

Average True Range	<p>Measures a security's volatility by averaging the True Range over a period of time you specify when setting up the study. True Range is the greatest of the following:</p> <ul style="list-style-type: none"> • The current high minus the current low. • The absolute value of the current high less the previous close. • The absolute value of the current low less the previous close. <p>Default of 14 periods can be changed.</p> <p>The ATR formula is an exponential average of the true range. True range takes into account any gap up or down from the previous day as well as the high and low for the current day. The formula is</p> $ATR_t = F * TR_t + (1-F) * ATR_{t-i}$ <p>where TR is the largest of the absolute values of High-Low , High-Yesterdays Close , and Yesterdays Close-Low .</p>
Bollinger Bands	<p>The top and bottom lines are placed n-standard deviations above and below the center line*. Since standard deviations are a measure of volatility, the bands widen during volatile price action and contract when the trading range tightens. You can change the variables used in the calculation from the defaults of period=20 and n=2 standard deviations above and below.</p> <p>*The center line is not included when applying a Bollinger Bands study. To get a center line, add a Moving Average - Simple study for the same number of periods (default=20) to the chart.</p> <p>Rather than two bands that are always an equal percentage away from the central average, Bollinger Bands expand and contract based on the standard deviation of the historical volatility of the price action. The formulas for the upper and lower bands are</p> $UpperBand = SMA_t + m * F_t$ $LowerBand = SMA_t - m * F_t$ <p>where m is the number of standard deviations and the formula for F_t is</p> $F_t = \sqrt{\frac{\sum_{i=t-n+1}^t (Price_i - SMA_t)^2}{n}}$

CCI	<p>The Commodity Channel Index ("CCI") measures the variation of a security's price from its statistical mean. High values show that prices are unusually high compared to average prices whereas low values indicate that prices are unusually low. Contrary to its name, the CCI can be used effectively on any type of security, not just commodities. The formula is</p> $CCI_t = \frac{Typ_t - \sum_{i=t-n+1}^n Typ_i}{.015 * \frac{1}{n} \sum_{i=t-n+1}^n \left Typ_i - \frac{1}{n} \sum_{i=t-n+1}^n Typ_i \right }$ <p>where</p> $Typ_t = \frac{High_t + Low_t + Close_t}{3}$
Directional Movement (DX)	<p>The Directional Movement study indicates the strength of a trend, independent of whether that trend is up or down. The study combines several components: +DI measures upward moves, -DI measures downward moves, DX combines +DI and -DI, and ADX is a smoothed version of DX.*</p>
DM(+DI) Positive	<p>The basic Directional Movement trading system involves comparing the 14-day +DI ("Directional Indicator") and the 14-day -DI. This can be done by plotting the two indicators on top of each other or by subtracting the +DI from the -DI. The study indicates buying when the +DI rises above the -DI and selling when the +DI falls below the -DI. You can change the periods used in the calculation from the default of 14.*</p>
DM(-DI) - Negative	<p>The basic Directional Movement trading system involves comparing the 14-day +DI ("Directional Indicator") and the 14-day -DI. This can be done by plotting the two indicators on top of each other or by subtracting the +DI from the -DI. The study indicates buying when the +DI rises above the -DI and selling when the +DI falls below the -DI. You can change the periods used in the calculation from the default of 14.*</p>
Envelope	<p>Employing an Envelope is similar to Bollinger Bands, except equidistant from the center average, in that the Envelope helps define the upper and lower boundaries of a security's normal trading range. When the security reaches the upper band, this may indicate a sell opportunity, whereas the security reaching the lower band may indicate a buy opportunity. Default of 20 periods with Upper and Lower % default of 6 can be changed. The formulas for the upper and lower envelopes are</p> $UpperEnvelope = SMA_t * (1 + F)$ $LowerEnvelope = SMA_t * (1 - F)$ <p>where F is a factor such as 6% (i.e. 0.06 for the formulas above).</p>

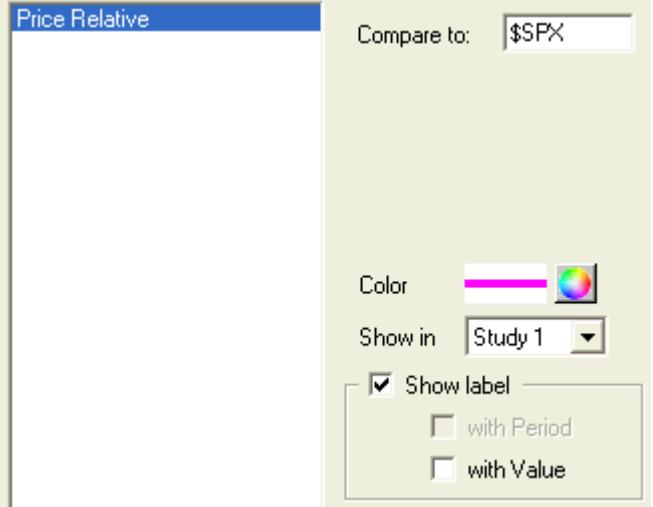
Historical Volatility	<p>Reflects how far an equity's price has deviated from its average price over the number of periods you specify. This study only applies to Daily, Weekly, and Monthly charts. Default of 20 periods can be changed.</p> <p>Historical volatility is calculated:</p> $Vol_t = \sqrt{\frac{\sum_{i=t-n+1}^t \left[\ln\left(\frac{P_i}{P_{i-1}}\right) - \frac{1}{n} \sum_{i=t-n+1}^t \ln\left(\frac{P_i}{P_{i-1}}\right) \right]^2}{n-1}}$
Keltner Channels	<p>Keltner Channels consist of two bands that are not equidistant from the SMA.</p> <p>Rather than two bands that are always an equal percentage away from the SMA, Keltner Channels expand and contract based on a moving average of the True Range (TR). The formulas for the upper and lower bands are</p> $UpperBand = SMA_t + F * SMATR_t$ $LowerBand = SMA_t - F * SMATR_t$ $SMATR_t = \frac{\sum_{i=t-n+1}^t (TR)_i}{n}$ <p>where F is a factor, and</p> $(TR)_i = \max(High_i - Low_i , High_i - Close_{i-1} , Close_{i-1} - Low_i)$

Last Close (Intraday)	<p>When selected with an intraday chart, a line will display indicating the prior day's close price.</p>  <p>AMAT Intraday (15 minute-1 day) Close</p> <p>9:30 10:00 11:00</p> <p>18.40 18.33 18.26 18.19 18.12</p> <p>1,332,463</p> <p>Stock symbols and price and volume data shown here and in the software are for illustrative purposes only. Charles Schwab & Co., its parent or affiliates, and/or its employees and/or directors may have positions in securities referenced herein, and may, as principal or agent, buy from or sell to clients.</p>
Moving Average Conv/Divergence (MACD)	<p>A trend-following momentum indicator using 3 exponential moving averages: a short or fast average, a long or slow average, and an exponential average of their difference (the last used as a signal or trigger line). You can change the periods used in the calculation from the defaults of 12 and 26. Used with Signal Line below.</p>
MACD Histogram	<p>A variation of the MACD that plots the difference between the Signal Line and MACD. Changes in the spread between these two lines may be spotted faster, potentially leading to earlier trading signals. You can change the periods used in the calculation from the defaults of 12, 26, and 9.</p>
Momentum	<p>Measures the amount the price of a security has changed over the last 14 days. If the current trading session today hasn't closed yet, it uses the last sale price. You can change the periods used in the calculation from the default of 14.</p> <p>The formula for an n-period Momentum is $Momentum_t = Price_t - Price_{t-n}$</p>
Money Flow	<p>Money Flow keeps a running total of the money flowing into and out of a security. The direction of the Money Flow line is the important component to watch, not the actual dollar amount. This indicator can be used to confirm underlying strength or weakness of a price trend.</p> <p>The formula for an n-period Money Flow is</p> $MoneyFlow_t = \sum_{i=t-n+1}^t \left(\frac{(Close_i - Low_i) - (High_i - Close_i)}{High_i - Low_i} \right) * Vol_i$

Money Flow Percent	<p>Money Flow Percent normalizes the Money Flow calculation above by dividing by the cumulative volume for the period.</p> <p>You can change the periods used in the calculation from the default of 14.</p> <p>The formula for an n-period Money Flow Percent is</p> $MoneyFlow\%_t = \left(\frac{1}{\sum_{i=t-n+1}^t Vol_i} \right) * \sum_{i=t-n+1}^t \left(\frac{(Close_i - Low_i) - (High_i - Close_i)}{High_i - Low_i} \right) * Vol_i$
Moving Average Exponential (EMA)	<p>While similar to the SMA, the exponential moving average uses a "smoothing factor" to give more weight to recent prices, while allowing all prices in the window to influence the average. The default of 20 periods can be changed.</p> <p>The EMA formula is an inductive formula; that is, the value at time t is based on the value at time t-1 and a current amount. The formula is</p> $EMA_t = F * Price_t + (1 - F) * EMA_{t-1}$ <p>where Price is set to the Average variable you select when you set up the study. F (Factor) can theoretically be any value between 0 and 1 but is generally related to an n-period SMA by the formula</p> $F = \frac{2}{n+1}$
Moving Average Simple (SMA)	<p>The average of the last 8-periods close values including current day. If current trading session hasn't closed yet, the last sale price is used. The default of 8 periods can be changed.</p> $SMA_t = \frac{\sum_{i=t-n+1}^t Price_i}{n}$ <p>The formula for an n-period SMA is</p>
Moving Average - Geometric (GMA)	<p>A moving average weighted on the price movement relative to the stock price, so that a \$1 increase in a \$5 stock is represented on the chart as a much greater move than a \$1 increase in a \$75 stock.</p> $GMA_t = \exp \left(\frac{\sum_{i=t-n+1}^t \ln(Price_i)}{n} \right)$ <p>The formula for an n-period GMA is</p> <p>where Price is set to the Average variable you select when you set up the study.</p>

Moving Average - Smoothed (OMA)	<p>An exponential moving average with a longer period used to determine the average, as older prices are never removed from the calculation but are given less weight. Best used in trending markets.</p> <p>The initial value of an n-day OMA is the same as the initial value of an n-period SMA indicator. Subsequent values are determined using an inductive formula, in the manner of the EMA described above.</p> $OMA_t = \frac{\sum_{i=t-n+1}^t Price_i}{n}$ <p>The formula for the initial value of OMA is</p> $OMA_t = \frac{n * OMA_{t-1} - OMA_{t-1} + Price_t}{n}$ <p>The formula for subsequent values is</p>
On Balance Volume (OBV)	<p>This indicator relates volume to price changes by adding volume to a running total when the price closes up for a period, then subtracts the volume if the stock closes down for a period. You can overlay the study on or underneath the price chart.</p> <p>The formula is</p> $OBV_t = \sum_{i=1}^t (S_i * Vol_i)$ <p>where $S_i = 1$ if $(Close_i - Close_{i-1}) > 0$ and $S_i = -1$ if $(Close_i - Close_{i-1}) < 0$</p>

Parabolic SAR	<p>The Parabolic SAR (stop and reverse) is a trend-following indicator that may help establish stop loss parameters, as well as signaling opportune times to buy or sell a stock. Because it's a trend-following indicator, it tends to be less useful in a sideways market and more useful in a strongly trending market.</p> <p>A line above the price may indicate a bearish trend, and a line below the price may point to a bullish stock.</p> <p>The formula is</p> $SAR_{Tomorrow} = SAR_{Today} + AF (EP_{Trade} - SAR_{Today})$ <p>where <i>AF</i> (Acceleration Factor) is one of a progression of numbers beginning at .02 and ending at .20. The <i>AF</i> is increased by .02 each day that a new high is made. You can change these values by editing the Minimum Step and Maximum Step fields when setting up the study on your chart.</p> <p>And EP_{Trade} = Extreme Price Point of the trade made so far. If you choose Long from the Position drop-down, <i>EP</i> is the extreme high price for the trade; if Short, <i>EP</i> is the extreme low price for the trade.</p>
Pivot Points (Intraday)	<p>Uses the previous day high, low, close, and open price to generate a pivot line, two support levels (S1 & S2), and two resistance levels (R1 & R2). This study is only displayed on Intraday charts. In the Studies window, you may check the lines you wish to view: R2, R1, Pivot, S1, S2</p> <p>! NOTE: Pivot Point lines may not be visible depending on the price scale you have set in Settings > General, and the price discrepancy between the previous and the current trading day.</p> <p>Pivot Points are calculated:</p> <pre> Pivot = (YesterdaysHigh + YesterdaysLow + YesterdaysClose) / 3.0; S1 = 2.0 * Pivot - YesterdaysHigh; R1 = 2.0 * Pivot - YesterdaysLow; S2 = Pivot - (R1 - S1); R2 = Pivot + (R1 - S1); </pre>

Price Relative (to Symbol)	<p>Compares the performance of the symbol currently loaded in the chart to the symbol specified in the studies settings window.</p> 
Rate of Change	<p>Change in price between the current price and the close 5 periods ago, divided by the price 5 periods ago. You can change the number of periods used in the calculation, and you can overlay the study on or underneath the price chart.</p> <p>The formula for an n-period Rate of Change</p> $RateOfChange_t = \frac{Price_t - Price_{t-n}}{Price_{t-n}}$ <p>is</p>

Relative Strength Index	<p>Indicates the degree of positive and negative movement by the stock on a scale of 0 (weakest) to 100 (strongest). Determined by figuring the ratio of the average up closes for the last 14 days (using today's current price for the 15th day) divided by the sum of the average up closes and the average down closes for the same period. This ratio is multiplied by 100. You can change the number of periods used in the calculation from the default of 15, and you can overlay the study on or underneath the price chart.</p> <p>The initial value of an n-period RSI is based on the price action for the first n periods. Subsequent values are determined using an inductive formula, analogous to the EMA formula described earlier.</p> $RSI = 100 * \frac{U}{U + D}$ <p>The formula for the initial value of RSI is</p> <p>where $U = \frac{1}{n} \sum_{t=1}^n (Close_t - Close_{t-1})$ for all $(Close_t - Close_{t-1}) > 0$</p> <p>and $D = -\frac{1}{n} \sum_{t=1}^n (Close_t - Close_{t-1})$ for all $(Close_t - Close_{t-1}) < 0$</p> <p>Subsequent values of RSI are determined using the formula</p> $RSI_t = 100 * \frac{U_t}{U_t + D_t}$ <p>where $U_t = \frac{1}{n} ((n-1)U_{t-1} + UP_t)$</p> <p>and $D_t = \frac{1}{n} ((n-1)D_{t-1} + DOWN_t)$</p> <p>where $UP_t = (Close_t - Close_{t-1})$ if $(Close_t - Close_{t-1}) > 0$ and 0 otherwise,</p> <p>and $DOWN_t = -(Close_t - Close_{t-1})$ if $(Close_t - Close_{t-1}) < 0$, 0 otherwise</p>
Signal Line	<p>Used with MACD. You can change the periods used in the calculation from the defaults of 12, 26 and 9.</p>
Stochastic - %D	<p>Part of the stochastic indicator along with %K. Shows the degree of smoothing, or moving average period, of %K. You can change the periods used in the calculation from the default of 14 periods and 3 periods.</p> <p>For calculation purposes, %D is an SMA of %K below.</p>

Stochastic - %D Slow	Similar in principle to %D, %D Slow represents a slower, less volatile indicator that simply adds an additional degree of smoothing, or moving average period, to the original %D. You can change the period used in the calculation from the default of 14 periods, 3 periods, and 3 periods. For calculation purposes, %D Slow is an SMA of %D above.
Stochastic - %K	Part of the stochastic indicator along with %D. Shows the price level of a stock in relation to its price range over a given period. You can change the period used in the calculation from the default of 14 periods. The formula for an n-period %K is $\%K = 100 * \frac{(Close - LowestLowInLastnPeriods)}{(HighestHighInLastnPeriods - LowestLowInLastnPeriods)}$
Stochastic RSI	Plots the Stochastic %D line of the RSI (Relative Strength Index) to represent the level of the RSI indicator relative to its range over the number of periods you specify. Default of 14 Stochastic and RSI periods, as well as the default Slowing Factor of 1 can be changed. You can also check the Ten Grid Lines box to display lines from 0.1 to 0.9 instead of two lines at .25 and .75. The formula for an m-period stochastic of an n-period RSI is $SRSI = 100 * \frac{(LatestRSI - LowestRSIinLastmPeriods)}{(HighestRSIinLastmPeriods - LowestRSIinLastmPeriods)}$

Volume/ Volume SMA	<p>Simply the number of shares (or contracts) traded during a specified time frame (e.g., hour, day, week, month, etc).</p> <p>You may also choose the Show SMA feature, which will show a simple moving average line in the Volume study. The image below shows the Volume study with a 20 period SMA overlayed.</p> 
Williams % R	<p>A momentum indicator that measures overbought and oversold levels. The interpretation of Williams %R is very similar to that of the %K stochastic indicator. The oversold indications are in the range of -80 to -100, while the overbought indications are in the range of -20 to 0. You can change the periods used in the calculation from the default of 12.</p> <p>For calculation purposes, %R is simply %K - 100.</p>

*Directional Movement is a trend-following system that consists of +DI, -DI, DX, and ADX. These values are interrelated as shown below.

$$ADX_t = F * DX_t + (1 - F) * ADX_{t-1}$$

$$DX_t = 100 * \frac{|(+DI_t) - (-DI_t)|}{(+DI_t) + (-DI_t)} \text{ if the denominator} > 0; 0 \text{ otherwise}$$

$$+DI_t = 100 * \frac{APDM_t}{AR_t} \quad \text{and} \quad -DI_t = 100 * \frac{AMDM_t}{AR_t}$$

$$\text{where } AR_t = F * R_t + (1 - F) * AR_{t-1},$$

$$\text{where } R_t = \max(|High_t - Low_t|, |High_t - Close_{t-1}|, |Close_{t-1} - Low_t|)$$

$$APDM_t = F * PDM_t + (1 - F) * APDM_{t-1}$$

$$AMDM_t = F * MDM_t + (1 - F) * AMDM_{t-1}$$

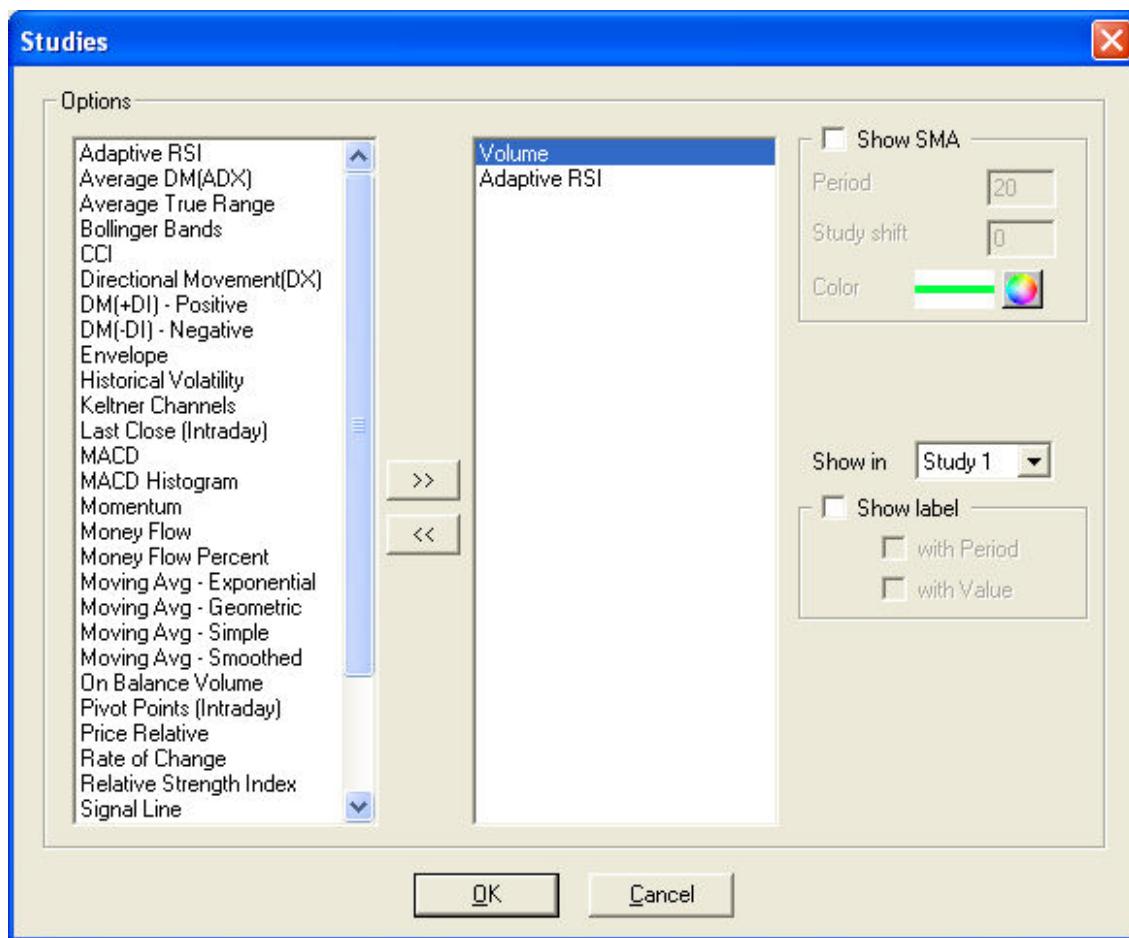
PDM_t is $(High_t - High_{t-1})$ if > 0 ; 0 otherwise. MDM_t is $(Low_t - Low_{t-1})$ if > 0 ; 0 otherwise. If both and are > 0 , the smaller is set to 0.

F (Factor) is related to an n-day SMA by the formula $F = \frac{2}{n+1}$.

❖ **TIP: Right-Click Shortcut to Add a Study or Trend Line**

- Right-click in the chart.
- Go to **Tools** and select **Studies** or **Trend lines** and select **New** or **Delete**.

ADD OR DELETE A STUDY



To Add a Study:

1. Click **Tools > Studies** and the Studies Set-up panel will appear.
2. Click on a study in the left column.
3. Click the **>>** button to activate the study.

To Customize the Study:

1. When it appears in the right column, click on the study to change its **Period(s)**, **Color**, **Show in**, and **Label** properties.
2. To change the default period, click in the window and add the new variable for your period.
3. Use the **Show In** drop-down to overlay the study in the main chart window or place the study in a separate pane below the chart.
4. **Study Data Points:** Certain studies may be more precise when using a larger set of data to calculate the study results, but occasionally, a chart will not have enough data to maximize the precision of the results. What StreetSmart Pro® charts do for studies where this applies is extend the period used to calculate the study up to 4x the study period to achieve the most accurate study results. Checking **Auto Optimize** will automatically try to achieve the most precise results given the amount of data available. By unchecking Auto Optimize, you have a choice about how much data to use in the study calculation. **Max Display** will use data only from the number of periods you specify. Max Precision will use data from the specified number of periods multiplied by 4.
5. Make the changes and click **OK**.

To Delete a Study:

Click on the study, then click the << button.

TREND LINES

Trend Lines are a technical indicator where a straight line is drawn connecting a series of prices with either a clear downward or upward trend.

Traders incorporating trend lines into their strategy may look for prices breaking through a trend line to potentially identify changing trends.

Set up Trend Lines from the **Insert > Trend Line** menu or click on one of the trend line icons from the Chart Tool Bar.

Up trends are defined by a trend line that is drawn between two or more troughs (low points) to identify price support within the trend. Down trends are defined by trend lines that are drawn between two or more peaks (high points) to identify price resistance within the trend.



Regular	A regular trend line will allow you to draw a line anywhere on the chart.
Snap To	Using a Snap to trend line, will place the trend line on the open, high, low, or close of the trend being studied.
Fibonacci Studies	There are four popular Fibonacci studies: arcs, fans, retracements, and time zones. The interpretation of these studies involves anticipating changes in trends as prices near the lines created by the Fibonacci studies. StreetSmart Pro includes fan, arc, and retracement studies.
Fibonacci Fan	Lines are displayed by drawing a trend line between two extreme points, for example, a trough and opposing peak. Then an "invisible" vertical line is drawn through the second extreme point. Three trend lines are then drawn from the first extreme point so they pass through the invisible vertical line at the Fibonacci levels of 38.2%, 50.0%, and 61.8%
Fibonacci Retracement	Lines are displayed by first drawing a trend line between two extreme points, for example, a trough and opposing peak. A series of nine horizontal lines are drawn intersecting the trend line at the Fibonacci levels of 0.0%, 23.6%, 38.2%, 50%, 61.8%, 100%, 161.8%, 261.8%, and 423.6%. (Some of the lines may not be visible because they will be off the scale.)
Fibonacci Arcs	This trend line separates the Fibonacci Arcs into a separate view. The three arcs, which center on the last point of the trend line you draw, help you identify where support and resistance may affect the price as a stock trends up or down. You can choose to show the percentage labels by clicking Show Levels .
Best Fit Regression	A Linear Regression trend line uses the least squares method to plot a straight line through prices so as to minimize the distances between the prices and the resulting trend line.
Delete Selected	<ol style="list-style-type: none"> 1. Click on the Trend line you wish to delete 2. Choose Delete Selected
Clear All Trend Lines	Click to erase all trend lines.

Draw the Trend Line:

- Once you have selected which Trend line to draw, left click at the spot on the chart where the line should start.
- Hold the mouse button down and move it across the chart to the end

point for the line.

- Release the mouse button.

Label the Trend Line:

- From the New trend line box, go to the **Label** field.
- Type the name or description as you want it to appear on the chart.
- Click **OK**.

Color of the Trend Line:

- From the New trend line box, click on the Color palette.
- Select the color you would like to have displayed.
- Click **OK** once to get back to the New trend line box, then click **OK** again to apply the color.

! NOTE: Once a Trend line has been drawn, it can be moved. Moving the trend line is done by clicking on the line to modify and then either end of the line can be adjusted to fit the slope of the line to the chart.